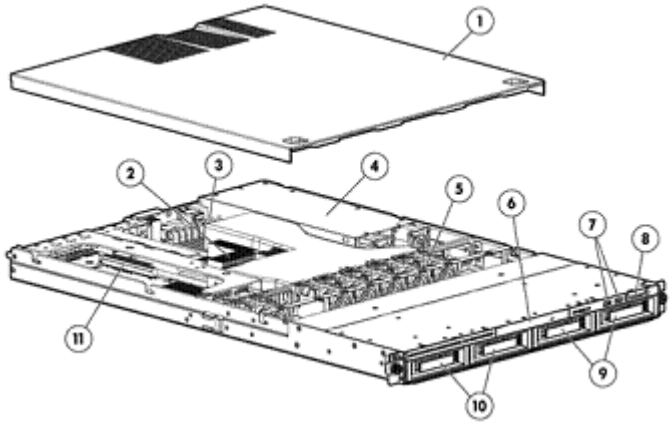
Overview

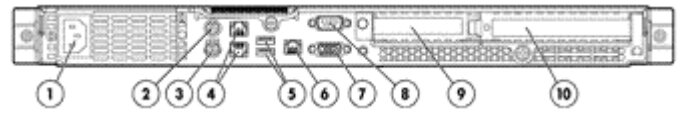
You have better things to do than worry about file storage in your small or remote office. But your users continue to demand more space for their data, and data protection and security are become more of a concern. You need to add file storage that's both powerful and easy to install and manage remotely, and you need to do it fast.

The HP ProLiant DL160 G5 Storage Server is a fast and easy way to add compact rack-mount file storage to your small or remote office network. The Microsoft Windows-powered operating system is pre-installed and internal storage is pre-configured, so you're up and serving files in minutes. It supports multiple file sharing protocols, so you can consolidate and make a single centralized platform to manage and protect, or you can create a scalable disk-based backup/replication target.

Once your solution is installed, you'll find that you spend less time and effort on file management and maintenance. You can manage and troubleshoot from outside the office with either remote desktop or Lights-Out 100i remote management. Since it's running Windows, it integrates seamlessly into your Active Directory and DFS environments, runs your favorite antivirus and backup software, and has a familiar management look and feel. And don't forget that you can use a DL160 G5 Storage Server as a print server, too.

All DL160 G5 Storage Servers are built on industry standards and include features that protect and optimize your investment. They pack all the performance and flexibility you need into only 1U of rack space, with quad-core processing and both SATA and SAS drive support. The operating system offers intelligent tools like Single-instance Storage (which de-duplicates file storage to save disk space) and supports the optional Microsoft® iSCSI Software Target so you can add block-based Exchange, SQL or other application storage capability to your network storage solution.





Front View:

1. Access panel
2. Quad-Core Intel® Xeon® E5405 2.00GHz processor (supports up to two)
3. Eight PC2-5300 (DDR2-667) fully buffered DIMM memory slots
4. Power supply (650 Watts)
5. System fans
6. DVD-ROM drive
7. Two USB ports
8. Power on/off & system LEDs

Rear View:

1. Power Supply cable socket
2. PS/2 Mouse Port
3. PS/2 Keyboard Port
4. Two GbE LAN ports for NIC 1 and NIC 2 (RJ-45)
5. Rear USB 2.0 Ports
6. Lights Out 100i port for remote management
7. Video Port
8. Serial Port

Overview

9. Four (4) 3.5" hot-plug SAS/SATA hard drive bays
10. Four (4) 3.5" hot-plug SAS/SATA hard drive bays
11. Two PCIe x16 Gen2 expansion slots (one open)

9. Low Profile PCIe Slot Cover (x16 slot open)
10. Full-sized PCIe Slot (occupied by Smart Array E200 controller)

What is a ProLiant Storage Server?

ProLiant Storage Servers are enhanced Windows-powered file and print server solutions for small or medium business, branch office, workgroup, or data center IT environments. These network storage devices are built on industry-standard HP ProLiant servers and come with either Microsoft Windows Storage Server 2003 R2 or Windows Unified Data Storage Server 2003 operating system pre-installed. Like many Network Attached Storage (NAS) devices, they support heterogeneous file serving environments and are pre-configured to install in minutes. And since they're Windows-based, network integration is easy, your antivirus and backup applications run right on the box, and management has a familiar look and feel. So you can add storage to your network quickly and spend less time on storage management, then get back to what matters most: running your business.

Highlights

The HP ProLiant DL160 G5 Storage Server is a Windows-powered 1U rack-mount network storage solution that delivers multi-protocol file sharing and print serving and in an affordable package. It's easy to install and manage, making it perfect for a small workgroup, small business or remote office.

- Operating System:
  - Microsoft Windows Storage Server 2003 Release 2, Standard x64 Edition
- Processors:
  - Quad-core Intel® Xeon® processor E5405 2.00GHz
  - One processor standard; up to 2 supported
- Memory:
  - 1GB (2 x 512MB) standard (640GB SATA model)
  - 2GB (2 x 1GB) standard (1TB, 2TB, 3TB SATA and 1.2TB SAS models)
- Storage Controller:
  - Smart Array E200/128MB Controller with BBWC
- Drive Support:
  - Four internal drive bays (3.5" Large Form Factor) that support hot-plug SATA or SAS HDDs
    - 4 x 160GB SATA LFF (640GB SATA model)
    - 4 x 250GB SATA LFF (1TB SATA model)
    - 4 x 500GB SATA LFF (2TB SATA model)
    - 4 x 750GB SATA LFF (3TB SATA model)
    - 4 x 300GB SAS LFF (1.2TB SAS model)
  - DVD-ROM drive to support System Restore
- Network Controller:
  - Two embedded NC105i PCIe Gigabit Server Adapters
- Expansion Slots:
  - Full-length, full-height PCIe x16 slot (occupied by Smart Array E200/128MB controller)
  - Half-length, low-profile PCIe x16 slot
- Redundancy:
  - Hot-plug SAS/SATA hard disk drives
- Management:
  - Microsoft Management Console (MMC)-based user interface

Overview

- Remote system management via Remote Desktop or Telnet
- HP ProLiant Lights-Out 100i remote management - Advanced Pack included

- Form Factor:
  - Rack (1U), (1.75-inch)
- Warranty:
  - Protected by HP Services and a worldwide network of resellers and service providers. One-year Next Business Day, on-site limited global warranty (one year parts, one year labor, one year on-site support). Certain restrictions and exclusions apply.

Features and Benefits

The fast and easy way to add file services to your network	The Windows-powered operating system is pre-installed and user storage is pre-configured, so it's a quick, secure, and easy way to add storage to your small/remote office network. Go from out-of-the-box to file serving in minutes, not hours.
A single centralized file server platform to manage and protect	Consolidate islands of direct-attached storage or low-capacity NAS devices to one easy-to-use Windows platform, or create a scalable disk-based backup or replication target.
Multi-protocol file serving	You can deploy in wide range of heterogeneous file serving environments with support for SMB/CIFS, NFS, HTTP, FTP, WebDAV, AppleTalk, and NetWare protocols.
Microsoft® Windows-powered operating system pre-installed	It's Windows, so it integrates seamlessly into your Active Directory and DFS environments, runs your favorite antivirus and backup applications, and limits your learning curve with its familiar user interface.
Intelligent storage management features	Make more efficient use of storage space using the file de-duplicating Single-instance Storage (SIS) feature and enjoy the benefits of other storage-specific tools like Indexed Search, SharePoint® Services support, Quotas, File Screening, Storage Reporting, and Distributed File System (DFS) Replication.
Remote manageability	You can manage and troubleshoot from almost anywhere at both the operating system level (with Remote Desktop or HTTPS) and at the hardware component level (using Lights-Out 100i remote management).
HP ProLiant industry-standard hardware	Relax-your investment is protected because you're not locked into a proprietary platform. The compact 1U rack mount platform features quad-core processing and supports four SATA or SAS 3.5" internal hard drives.
Print server support	Don't forget that a DL160 G5 Storage Server is a Windows print server too, offering consolidation benefits to your Windows print environment.
Microsoft® iSCSI Software Target support	Upgrade your ProLiant Storage Server to host block-based application storage to further consolidate and lower hardware and administrative costs.

Standard Features

Operating System	Microsoft Windows Storage Server 2003 R2, Standard x64 Edition • 64-bit processing (compatible with 32-bit applications) • Optimized for File Serving: Up to 20% faster file serving performance than a general-purpose Windows Server 2003 R2 installation on the same hardware. • HP-enhanced File Server Management Console: Features the familiar look and feel of the Microsoft Management Console (MMC). • HP Rapid Start-up Wizard: Simplifies and accelerates new device deployment by walking you through basic system settings step-by-step. • Single-instance Storage (SIS): Recovers up to 35% of disk space by de-duplicating files and reducing the amount of redundant data stored. Identifies identical files, stores a single copy of the file in a central repository, and replaces the files with pointers to the file in the SIS common store. • Search Enhancements: Indexing Service extracts the information from a set of documents and organizes it in a way that makes it quick and easy to access that information through the Search function for computers running Windows 2000 or Windows XP. • File Server Resource Manager (FSRM): Provides both on-demand and scheduled reports detailing storage use, allows administrators to create and manage folder and volume quotas, and permits both name-based screening of files and allowing/disallowing file creation on specified folder trees. • Windows SharePoint® Services: A powerful Web-based team collaboration environment that provides an integrated portfolio of collaboration and communication services designed to connect people, information, processes, and systems. • Distributed File System (DFS) Management Console: Updated DFS namespace failover, failback and prioritization controls. • Distributed File System Replication (DFS-R): State-based, multi-master replication engine that supports replication scheduling and bandwidth throttling. DFS-R uses a new compression algorithm that efficiently updates files over limited bandwidth networks by replicating only the changes needed to ensure global file consistency. • Full support of Volume Shadow Copy Service, which creates point-in-time copies of files and folders at predetermined time intervals that can then be accessed from client computers. • Unlimited Client Access Licenses (CALs) included • Microsoft Services for Network File System (NFS) • Support for multiple file serving protocols, including SMB/CIFS, NFS, HTTP, FTP, WebDAV, AppleTalk, and NetWare • Print Management Console: Manage multiple printers (license for unlimited printer support) from a single console, whether locally or over the WAN • Support for any number of SATA or SAS drives and multiple network ports
Processor	Quad-Core Intel® Xeon® E5405 (2.00GHz, 80W, 1333MHz FSB)
Cache Memory	12MB (2 x 6MB) Level 2
Chipset	Intel® 5400 Chipset

Standard Features

Memory

Type	PC2-5300 Fully Buffered DIMMs (DDR2-667)
Memory Protection	Advanced ECC
DIMM Sockets	8
Maximum configuration	32 GB (8 x 4 GB)
640GB SATA model	
Standard	1 GB (2 x 512MB)
1TB SATA, 2TB SATA, 3TB SATA and 1.2TB SAS models	
Standard	2 GB (2 x 1GB)

Network Controller

Two embedded NC105i PCIe Gigabit Server Adapters

Expansion Slots

Slot Number	Bus Speed	Bus Number*	Device Number**	Hot Plug (Y/N)	PCI Voltage	Notes
1	x16 PCI-Express Gen2	1	0	No	3.3 volts	Full-length, full height (occupied by SA E200)
2	x16 PCI-Express Gen2	6	3	No	3.3 volts	Low-profile, half-length

* Default bus assignment. Inserting cards with PCI bridges may alter the actual bus assignment number.

** Slots enumerate from lowest to highest Device ID by bus (starting with the lowest bus).

Storage Controller

Smart Array E200 Storage Controller with 128MB Battery Backed Write Cache

- RAID 0/1/5
- x4 2.5G PCI Express host interface

Storage

Hard Drives	Internal: • 4 x 160GB SATA 7.2K LFF HDDs (640GB SATA model) • 4 x 250GB SATA 7.2K LFF HDDs (1TB SATA model) • 4 x 500GB SATA 7.2K LFF HDDs (2TB SATA model) • 4 x 750GB SATA 7.2K LFF HDDs (3TB SATA model) • 4 x 300GB 3G SAS 15K LFF DP HDDs (1.2TB SAS model)
Optical Drive	DVD-ROM drive

Maximum Internal Storage (raw)

Internal hot plug LFF SATA	3 TB	4 x 750GB SATA
Internal hot plug LFF SAS	1.2 TB	4 x 300GB SAS
Internal plus External (requires addition of Smart Array E500/256MB controller)	12TB	4 x 750GB LFF SATA int. + 12 x 750GB LFF SATA ext.

Standard Features

Interfaces	Parallel	None
	Network RJ-45(Ethernet)	(2) 10/100/1000 NIC ports (plus 1 dedicated to HP ProLiant Lights Out 100i Remote Management)
	Serial	1
	Pointing Device (Mouse)	1
	Graphics	1
	Keyboard	1
	USB	5 (two front, one internal, and two rear) NOTE: Please see the following URL for additional information regarding USB support: http://h18004.www1.hp.com/products/servers/platforms/usb-support.html.

Graphics

Integrated on the system board:

- 1280 x 1024 at 8bpp (bits per pixel) or 2^8 = 256 colors or
- 1024 x 768 at 16bpp (bits per pixel) or 2^16 = 65536 or 64k colors

Management

Microsoft Management Console (MMC)-based user interface (also accessible via HTTPS)

Remote system management via Remote Desktop or Telnet

HP ProLiant Lights Out 100i Remote Management with Advanced Pack standard

Lights-Out 100i Remote Management allows you or your service provider to remotely control and manage a DL160 G5 Storage Servers over a LAN or the Internet regardless of the server's state of operation.

- Remote Serial Console
- Virtual Power Button
- Environmental monitoring
- Browser access
- Command line access
- IP Configuration
- User Accounts
- System Event Log
- Network Connectivity
- Integration with HP Systems Insight Manager
- Advanced Pack: Virtual KVM graphic console, Virtual Media, Secure Socket Layer and Secure Shell Security

NOTE: For more information on Lights-Out 100i, please visit: http://www.hp.com/servers/lightsout.

Form Factor

Rack Mount (1U), (1.75 in/4.45 cm)

Standard Features

Industry Standard Compliance	ACPI V2.0 Compliant PCI 2.2 Compliant PXE Support WOL Support Microsoft® Logo certifications IPMI 2.0, SMASH CLP compliant
Server Power Cords	One Highline IEC power cord standard (for connection to a Power Distribution Unit)
Power Supply	650 Watts, auto-switching, PFC (Power Factor Correcting); non-redundant, non-hot-plug
UPS and PDU Power Cord Matrix	Please see the UPS and PDU cable matrix that lists cable descriptions, requirements, and specifications for UPS and PDU units: http://h18004.www1.hp.com/products/servers/proliantstorage/power-protection/index.html.
System Fans	6 system fans standard; non-redundant, non-hot-plug
Rack Airflow Requirements	Rack 10000 series Cabinets The increasing power of new high-performance processor technology requires increased cooling efficiency for rack-mounted servers. The 10000 Series Racks provide enhanced airflow for maximum cooling, allowing these racks to be fully loaded with servers using the latest processors. CAUTION: If a third-party rack is used, observe the following additional requirements to ensure adequate airflow and to prevent damage to the equipment: Front and rear doors: If your 42U server rack includes closing front and rear doors, you must allow 5,350 sq cm (830 square inches) of hole evenly distributed from top to bottom to permit adequate airflow (equivalent to the required 64 percent open area for ventilation). Side: The clearance between the installed rack component and the side panels of the rack must be a minimum of 7 cm (2.75 inches) CAUTION: Always use blanking panels to fill all remaining empty front panel U-spaces in the rack. This arrangement ensures proper airflow. Using a rack without blanking panels results in improper cooling that can lead to thermal damage. NOTE: For additional information, refer to the Setup and Installation Guide or the Documentation CD provided with the server, or to the server documentation located in the Support section at the following URL: http://h18000.www1.hp.com/products/servers/proliantDL145/index.html
Telco Rack Support	Telco Rack Kit: NOTE: Support for all 2-post Telco racks requires the use of the standard rack kit and an additional option kit from Rack Solutions: http://www.racksolutions.com/hp

Optional Software from HP for Storage Servers

- Microsoft® iSCSI Software Target - Powerful iSCSI software target solution that provides affordable application storage provisioning, protection, and availability for small and medium office environments. The software adds block storage capability to ProLiant Storage Servers and creates a single platform that delivers file, print, and application storage services, all over existing Ethernet networks. It helps administrators consolidate storage capacity, improve storage utilization, minimize system downtime, simplify backup operations, enable rapid recovery, and provides high availability for key applications and services.

  For more information: http://h18006.www1.hp.com/products/storageworks/ms_iscsi/index.html
- HP StorageWorks Storage Mirroring Software - HP StorageWorks Storage Mirroring offers a host-based application that performs remote copy over an IP LAN/WAN. Key features include asynchronous replication that can be scheduled to a fine granular level, Logical Unit Number (LUN), file or byte level. Other features include multiple replication configuration options including peer-to-peer and many-to-one. In addition, Storage Mirroring is a very cost effective disaster recovery alternative from one host to another within a LAN, storage center, or between direct attached storage in metro offices and regional centers. Additional configurations allow replication from small office environments to ensure business continuity without an outside IT staff.

  For more information: http://h18006.www1.hp.com/products/storage/software/sm/index.html
- HP Data Protector Software - HP Data Protector software is enterprise data protection and disaster recovery, ensuring recovery from any disruption. Data Protector integrates a variety of techniques to eliminate backup and recovery windows. The capabilities to eliminate planned downtime range from online backup and backup of open files to zero-downtime, zero-impact backup. The software provides industry-leading instant recovery as well as several disaster recovery alternatives to eliminate unplanned downtime, allowing recovery of entire data centers in minutes.

  Data Protector is enabling organizations to reduce costs by automating routine tasks to maximize the effectiveness of the data protection staff. For the price of an entry-level product, it provides the enterprise functionality customers need. Data Protector scales from single server to distributed enterprise, covering an extensive range of heterogeneous applications, operating environments and storage configurations with a single solution.

  All ProLiant Storage Servers support using Data Protector as a backup software solution.

  For more information on HP Data Protector:
  http://h18006.www1.hp.com/products/storage/software/dataprotector/index.html
- HP StorageWorks File Migration Agent - HP FMA is an automated solution designed to help simplify Windows-based file, web, and application server administration in small business to enterprise environments. This is accomplished through policy-based file migration and archive to popular storage targets, including HP StorageWorks Reference Information Storage System (RISS), HP StorageWorks File System Extender, and NAS, via Common Internet File System (CIFS).

  The following Windows Storage Server features or add-ons are currently NOT supported by HP File Archiving software:
  NOTE: Single Instance Storage (SIS) - (NOT SUPPORTED)
  NOTE: DFS-Replication (DFS-R) - (NOT SUPPORTED)
  NOTE: File Server Resource Manager (FSRM) - Content Filter, & File Screening - (NOT SUPPORTED)

  For more information: http://h18006.www1.hp.com/products/storage/software/fma/
- HP Storage Essentials NAS Manager Software - Provides comprehensive Network Attached

Optional Software

Storage (NAS) management capabilities for HP ProLiant Storage Server. Visualize your distributed HP NAS solutions and centrally manage their capacity, performance, events, and dependencies to ensure NAS availability and performance and unify SAN and NAS management.

For more information on the complete line of HP Storage Essential products go to:
http://www.hp.com/go/storageessentials

Service and Support, HP Care Pack, and Warranty Information

Warranty

The DL160 G5 Storage Server comes with a standard 1-1-1 warranty (1 year parts exchange, 1 year labor and 1 year onsite, next business day response)

Services Included with the Product

One year of HP Software Support, standard 9x5 business hours (software technical support and software product and documentation updates).

Service and Support Upgrade options

- Response - Upgrade on-site response from next business day to same day 4-hours
- Coverage - Extend hours of coverage from 5 days x 9 hours to 7 days x 24 hours
- Duration - Select duration of coverage for a minimum period of 1year or multiple years

HP offers a portfolio of services ranging from Storage Design and Architecture that provides a complete multi-site design and implementation, to various levels of on-going maintenance support. Additionally the basic warranty service can be enhanced and/or HP Installation services can be purchased. Specifically HP Care Pack services include

Product number(s)	Care Pack	Duration	Commercial reseller channels	Direct & Enterprise channels
AJ672A AJ673A AJ674A AJ675A AJ676A	HP Software Support for Storage, 9 x 5	1 year	Bundled	Bundled
		3 years	n/a	HA106A3 - 6Z5
		4 years	n/a	HA106A4 - 6Z5
		5 years	n/a	HA106A5 - 6Z5
	HP Software Support for Storage, 24 x 7	1 year	n/a	HA106A5 - 6Z5
		3 years	n/a	HA107A1 - 6Z5
		4 years	n/a	HA107A3 - 6Z5
		5 years	n/a	HA107A4 - 6Z5
	Support Plus for Storage	1 year	UH171E	HA107A5 - 6Z5
		3 years	UH173E	HA109A1 - 6Z5
		4 years	n/a	HA109A3 - 6Z5
		5 years	n/a	HA109A4 - 6Z5
		Post Warranty	UH175PE	HA109A5 - 6Z5
	Support Plus 24 for Storage	1 year	UH172E	n/a
		3 years	UH174E	HA110A1 - 6Z5
		4 years	n/a	HA110A3 - 6Z5
		5 years	n/a	HA110A4 - 6Z5
		Post Warranty	UH176PE	HA110A5 - 6Z5
	Proactive 24 (P24)	1 year	n/a	n/a
		3 years	n/a	HA111A1 - 6Z5
		4 years	n/a	HA111A3 - 6Z5
		5 years	n/a	HA111A4 - 6Z5
	6 hour CTR	1 year	UD576E	HA105A1 - 6Z5
		3 years	UD577E	HA105A3 - 6Z5
		4 years	n/a	HA105A4 - 6Z5
		5 years	n/a	HA105A5 - 6Z5
	Installation	n/a	U7986E	HA113A1 - 5D6

HP Software Support	• Connect with HP Response Center engineers via telephone, electronic communication, or FAX for assistance in resolving software implementation or operations problems. • HP Services provides corrective support to resolve identifiable and reproducible software product problems, and to help you identify problems that are difficult to reproduce. • 9x5 coverage - Service is available during standard business hours, Monday through Friday (excluding holidays).
HP Software Support, 24 x 7	• Provides all the benefits of the regular Software Support, plus HP Services engineers are available around the clock 365 days per year.
HP Support Plus	• Increases the performance and availability of your IT infrastructure with comprehensive, consistent hardware and software services. HP Services engineers deliver onsite hardware support and over-the-phone software support 13 hours per day, 5 days per week. • Encompasses the HP ProLiant Storage Server products, selected multi-vendor hardware and provides trouble-shooting software problems which range from the Storage Server 2003 operating system to the available utilities. In addition, this service makes software updates available to you at substantial savings. • Provides recovery and re-configuration assistance of the HP ProLiant Storage Server using the recovery disk and your saved configuration file.
HP Support Plus 24	• Provides all the benefits of the regular Support Plus Care Pack, plus HP Services engineers are available to deliver onsite hardware and over-the-phone software support around-the-clock 365 days per year.
HP Proactive 24	• An integrated hardware and software support solution that combines efficient problem prevention with responsive technical assistance whenever you need it. • Improves the effectiveness of technologies across your IT infrastructure, and also, establishes a collaborative relationship between you and HP that strengthens your IT team and gives you rapid access to our expertise as issues arise

Software Product Services	• Standard HP warranty ensures Software media will be free of physical defects for a period of 90 days from delivery. • These services are available to upgrade the warranty to (1 or 3) full year of 9 hours by 5 days (or 24x7) software advisory and remedial software telephone support, new version license rights, and media and documentation distribution service.

Hardware Product Services

- Installation services
- On-site maintenance (includes warranty support)
- Response time upgrades during the warranty period
- Post-warranty coverage
- RAID setup and performance consulting via statement of work
- Migration service consulting via statement of work

For additional hardware installation and maintenance information, please refer to the URLs listed below:
http://www.hp.com/hps/storage/ns_nas.html

HP offers a portfolio of services ranging from Storage Design and Architecture that provides a complete multi-site design and implementation, to various levels of on-going maintenance support. Additionally the basic warranty service can be enhanced and/or HP Installation services can be purchased.
Our Proactive 24 annuity service (with the SAN Module) allows continuous SAN/NAS growth by ensuring that your entire SAN/NAS is safely kept updated with analysis and recommendations on relevant, ongoing firmware (FW) changes and it ensures rapid resolution of complex SAN/NAS issues.

Our SAN Solution Service is a one-time review of your entire SAN/NAS and all the components (applications, HBAs, switches and FW, arrays etc) to ensure that all components are at tested, HP Certified levels. The HP SAN Design/Architecture Service provides as broad and as deep a review and recommendation as needed of how your SAN/NAS environment can be designed and implemented to meet your business storage needs.

The on-going support offerings include various response times (4 hour same day, next day, etc) as well as coverage periods (Monday - Friday, 24x7, 1 yr, 3 yr, etc). These services are available for both hardware and software to ensure all customer support needs are met and can be purchased from either value or volume channels.

Finally HP offers an optional migration service to assist the customer in moving to the newest product release. This may be in the form of a defined kit and service, or may alternatively be performed on a time & material basis.

HP Services allows the customer to leverage HP's experience in selecting and configuring the most widely used security features, and provides an environment that is immediately more available due to increased change control and significantly improved data security.
For more information on these and other service options, please contact any of our worldwide sales offices or visit our Web site at: http://www.hp.com/hps/storage/ns_nas.html

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Installation Services

The service deployment activities will include:

- Unpacking the product, performing initial inspection, and setting up product hardware and power connectivity
- Connecting Customer-provided cables
- Setting the network address and setting appropriate domain variables in the NAS operating system
- Configuring the storage by creating a file share
- Configuring user mapping to make the share available for access
- Creating a sample file data copy or Snapshot

	Product number(s):	Care Pack	Duration	Commercial reseller channels	Direct & Enterprise channels
	All	Installation for Storage (per event)	One time	Available	HA113A1 - 5D6

Components

The following brick level options/components do not have individual HP Care Pack Services. These items will be included in product HP Care Pack Services into which they are installed.

Disk Drives	Tape Drives	CD/DVD ROM	SCSI Hubs in SBBs
Bus Converters	Backplane RAID Controllers	Power Supplies	Cabling

Product Configuration Wizard

In the following you will be guided through a series of steps to help you configure your ProLiant Storage Server.
NOTE: Options ship separately and are not factory integrated.

Step 1 – Choose a Model

Select one of five available DL160 G5 Storage Server models.
NOTE: Models names are based on raw storage capacity, not available user storage.

HP ProLiant DL160 G5 Storage Server Common Specifications	Operating System	Microsoft Windows Storage Server 2003 Release 2, Standard x64 Edition
	Processor	Quad-Core Intel® Xeon® processor E5405 (2.00GHz, 80W, 1333MHz FSB)
	Cache Memory	12MB (2 x 6MB) Level 2
	Number of Processors	1
	Memory Type	PC2-5300 DDR2 fully buffered DIMMs (667MHz)
	Storage Controller	Smart Array E200 Storage Controller with 128MB battery-backed write cache (BBWC); occupies one PCIe slot
	Network Controller	Two embedded NC105i PCIe Gigabit Server Adapters
	Expansion Slots	Two PCIe slots: • Full-length, full-height PCIe x16 slot (occupied by Smart Array E200/128MB controller) • Half-length, low-profile PCIe x16 slot
	Optical Drive	DVD-ROM drive
	Remote Management	HP ProLiant Lights Out 100i with Advanced Pack included
	Form Factor	Rack (1U), (1.75-inch)
	Factory Racking	Factory integrates select Storage Servers with other HP products such as HP ProLiant Servers or Enterprise Virtual Arrays. NOTE: #0D1 will appear after the part number on the sales order if HP factory integration is supported.

HP ProLiant DL160 G5 640GB SATA Storage Server AJ672A	Memory	1GB (2 x 512MB)
	Internal Storage	4 x 160GB SATA 7.2K 3.5" hot-plug HDDs
HP Proliant DL160 G5 640GB SATA Storage Server Smart Buy AK353A	Kit Contents	Part Number AJ672A HP StorageWorks Proliant DL160 G5 640GB SATA Storage Server. More info on HP Smart Buys go to: http://www.hp.com/go/smartbuy/storage

HP ProLiant DL160 G5 1TB SATA Storage Server AJ673A	Memory	2GB (2 x 1 GB)
	Internal Storage	4 x 250GB SATA 7.2K 3.5" hot-plug HDDs
HP Proliant DL160 G5 1TB SATA Storage Server Smart Buy AK354A	Kit Contents	Part Number AJ673A HP StorageWorks Proliant DL160 G5 1TB SATA Storage Server. More info on HP Smart Buys go to: http://www.hp.com/go/smartbuy/storage

HP ProLiant DL160 G5 2TB SATA Storage Server AJ674A	Memory	2GB (2 x 1 GB)
	Internal Storage	4 x 500GB SATA 7.2K 3.5" hot-plug HDDs
HP Proliant DL160 G5 2TB SATA Storage Server Smart Buy AK355A	Kit Contents	Part Number AJ674A HP StorageWorks Proliant DL160 G5 2TB SATA Storage Server. More info on HP Smart Buys go to: http://www.hp.com/go/smartbuy/storage
HP ProLiant DL160 G5 3TB SATA Storage Server AJ675A	Memory	2GB (2 x 1 GB)
	Internal Storage	4 x 750GB SATA 7.2K 3.5" hot-plug HDDs
HP Proliant DL160 G5 3TB SATA Storage Server Smart Buy AK356A	Kit Contents	Part Number AJ675A HP StorageWorks Proliant DL160 G5 3TB SATA Storage Server. More info on HP Smart Buys go to: http://www.hp.com/go/smartbuy/storage
HP ProLiant DL160 G5 1.2TB SAS Storage Server AJ676A	Memory	2 GB (2 x 1 GB)
	Internal Storage	4 x 300 GB 3 G SAS 15K 3.5" DP hot-plug HDDs
HP Proliant DL160 G5 1.2TB SAS Storage Server Smart Buy AK357A	Kit Contents	Part Number AJ676A HP StorageWorks Proliant DL160 G5 1.2TB SAS Storage Server. More info on HP Smart Buys go to: http://www.hp.com/go/smartbuy/storage

Step 2 - Add Another Processor

You can add a second processor to any DL160 G5 Storage Server.

Processors	Quad-Core Intel® Xeon® processor E5405 (2.00GHz, 80W, 1333MHz FSB) Option Kit	446077-B21

Step 3 - Add More Memory

NOTE: The 640GB SATA model includes 1GB (2 x 512MB) of SDRAM standard while the 1TB SATA, 2TB SATA, 3TB SATA and 1.2TB SAS models include 2GB (2 x 1GB) standard. All models are expandable to 32GB.
NOTE: All models have a total of eight DIMM sockets. See 'Memory' section of QuickSpecs below for more information on memory configuration.

Memory (FBDIMMs)	1 GB FBD PC2-5300 2 x 512 MB Kit	397409-B21
	2 GB FBD PC2-5300 2 X 1 GB Kit, Low Power	461826-B21
	2 GB FBD PC2-5300 2 x 1 GB Kit	397411-B21
	4 GB FBD PC2-5300 2 x 2 GB Kit, Low Power	461828-B21
	4 GB FBD PC2-5300 2 x 2 GB Kit	397413-B21
	8 GB FBD PC2-5300 2 x 4 GB LP Kit	466440-B21
	8 GB FBD PC2-5300 2 x 4 GB Kit	397415-B21

Step 4 - Add a Network Adapter

DL160 G5 Storage Servers have one low-profile PCI Express x16 slot available for additional network ports, a backup HBA, or external storage expandability.
NOTE: Choose only one expansion card.
NOTE: Multifunction Server Adapters support the installed Microsoft Windows Server 2003 Scalable Networking Pack, which enables TCP Chimney offload, Receive-side Scaling (RSS), and Network Direct Memory Access (NetDMA) features.

Network Adapters	HP NC110T PCI Express Gigabit Server Adapter	434905-B21
	HP NC360T PCI Express Dual Port Gigabit Server Adapter	412648-B21
	HP NC364T PCI Express Quad Port Gigabit Server Adapter	435508-B21
	HP NC373F PCI Express Multifunction Gigabit Server Adapter	394793-B21
	HP NC373T PCI Express Multifunction Gigabit Server Adapter	394791-B21
	HP NC380T PCI Express Dual Port Multifunction Gigabit Server Adapter	394795-B21
	HP NC510C PCIe 10 Gigabit Server Adapter NOTE: A minimum of 1 gigabyte (1 GB) of server memory is required per each NC510C adapter.	414129-B21
	HP NC510F PCIe 10 Gigabit Server Adapter NOTE: A minimum of 1 gigabyte (1 GB) of server memory is required per each NC510F adapter.	414126-B21

Step 5 – Add More Storage

DL160 G5 Storage Servers come standard with one installed Smart Array E200 controller for internal drives. They have one low-profile PCI Express x16 slot available for additional network ports, a backup HBA, or external storage expandability.

Storage Controllers	SAS Controllers	
	Smart Array E500 Controller	
	Smart Array E500/256MB Controller	435129-B21
	SAS HBAs	
	HP SC44Ge Host Bus Adapter NOTE: For external tape support only.	416096-B21

	NOTE: Please see the following QuickSpecs for additional information: http://h18004.www1.hp.com/products/quickspecs/12617_na/12617_na.html (SC44Ge HBA)	
	SCSI HBAs	
	HP SC11Xe Host Bus Adapter	412911-B21
	HP U320e SCSI Host Bus Adapter	AH627A
	NOTE: Please see the following QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12566_na/12566_na.html (SC11Xe HBA)	
External Storage Enclosures	HP StorageWorks Modular Smart Arrays	
	NOTE: Require addition of a Smart Array E500/256MB controller	
	HP StorageWorks Modular Smart Array 50 Enclosure (MSA50)	364430-B21
	NOTE: Rack-mountable 10 drive (2.5" SAS/SATA) 1U enclosure with 3Gb/s SAS host connectivity and redundant power supplies.	
	HP StorageWorks 60 Modular Smart Array (MSA60)	418408-B21
	NOTE: Rack-mountable 12 drive (3.5" SAS/SATA) 2U enclosure with 3Gb/s SAS host connectivity and redundant power supplies.	
	HP StorageWorks MSA60 1.8TB SAS HDD Bundle (MSA60 w/12 146GB 15K SAS LFF HDD)	AG822A
	HP StorageWorks MSA60 9TB SATA HDD Bundle (MSA60 w/12 750GB 15K SATA LFF HDD)	AG823A
	HP StorageWorks MSA60 3.6TB SAS HDD Bundle (MSA60 w/12 300GB 15K SAS LFF HDD)	AG824A
	NOTE: The MSA60 bundles are available in the Americas, Asia Pacific (AP) and Japan only. They are not available in Europe, Middle East and Africa.	
	HP StorageWorks 70 Modular Smart Array (MSA70)	418800-B21
	NOTE: Rack-mountable 25 drive (2.5" SAS/SATA) 2U enclosure with 3Gb/s SAS host connectivity and redundant power supplies.	
	HP StorageWorks MSA70 1.8TB SAS HDD Bundle (MSA70 w/25 72GB 15K SAS SFF HDD)	AG825A
	HP StorageWorks MSA70 3.6TB SAS HDD Bundle (MSA70 w/25 146GB 10K SAS SFF HDD)	AG893A
	NOTE: The MSA70 bundles are available in the Americas, Asia Pacific (AP) and Japan only. They are not available in Europe, Middle East and Africa.	
	NOTE: Please see the following QuickSpecs for Technical Specifications additional information: http://h18000.www1.hp.com/products/quickspecs/12245_na/12245_na.html (MSA50) http://h18000.www1.hp.com/products/quickspecs/12627_na/12627_na.html (MSA60) http://h18000.www1.hp.com/products/quickspecs/12652_na/12652_na.html (MSA70)	

Hard Drives (External Expansion)	Serial Attached SCSI (SAS) Hard Drives	
	Hot Plug 3.5" (LFF) SAS	
	HP 72GB 3G SAS 15K 3.5" DP HDD	384852-B21
	HP 72GB 3G SAS 15K 3.5" SP HDD	375870-B21
	HP 146GB 3G SAS 15K 3.5" DP HDD	384854-B21
	HP 146GB 3G SAS 15K 3.5" SP HDD	375872-B21
	HP 300GB 3G SAS 15K 3.5" DP HDD	416127-B21
	HP 300GB 3G SAS 15K 3.5" SP HDD	431944-B21
	Hot Plug 2.5" (SFF) SAS	
	HP 146GB 3G SAS 10K SFF SP HDD	431958-B21
	HP 146GB 3G SAS 10K SFF DP HDD	418367-B21
	HP 72GB 3G SAS 10K SFF SP HDD	375861-B21
	HP 72GB 3G SAS 10K SFF DP HDD	384842-B21
	HP 72GB 3G SAS 15K SFF SP HDD	431935-B21
	HP 72GB 3G SAS 15K SFF DP HDD	418371-B21
	HP 36GB 3G SAS 15K SFF SP HDD	431933-B21
	HP 36GB 3G SAS 15K SFF DP HDD	418369-B21
	NOTE: Please see the SAS Hard Drive QuickSpecs for Technical Specifications such as capacity, height, width, interface, transfer rate, seek time, physical configuration, and operating temperature: http://h18000.www1.hp.com/products/quickspecs/12244_na/12244_na.html	
	Serial ATA (SATA) Hard Drives	
	Hot Plug 3.5" (LFF) SAS	
	HP 750GB SATA 7.2K 3.5" HDD	432341-B21
	HP 500GB SATA 7.2K 3.5" HDD	395473-B21
	HP 250GB SATA 7.2K 3.5" HDD	349239-B21
	Hot Plug 2.5" (SFF) SAS	
	HP 120GB SATA 5.4K SFF HDD	431786-B21
	HP 60GB SATA 5.4K SFF HDD	379306-B21
	NOTE: SATA drives have a 1 year warranty. Please see the SATA Hard Drive QuickSpecs for Technical Specifications such as capacity, height, width, interface, transfer rate, seek time, physical configuration, and operating temperature: http://h18000.www1.hp.com/products/quickspecs/12091_na/12091_na.html	

Step 6 - Add Optional Software

Microsoft® iSCSI Software Target	Microsoft iSCSI Software Target adds block storage capability to ProLiant Storage Servers and creates a single platform that delivers file, print, and application storage services, all over existing Ethernet networks. It is a powerful iSCSI software solution that provides affordable application storage provisioning, protection, and availability for small and medium office environments. It helps administrators consolidate storage capacity, improve storage utilization, minimize system downtime, simplify backup operations, enable rapid recovery, and provides high availability for key applications

	and services.	
	Microsoft iSCSI Target Software 1 LTU	T4433A
	NOTE: For more information go to HP's Microsoft® iSCSI Software Target website at: http://h18006.www1.hp.com/products/storageworks/ms_iscsi/index.html	
HP StorageWorks Storage Mirroring Software	HP Storage Mirroring Software provides host-based replication and failover to IP-based networks. Patented replication and failover technology continuously captures byte-level data changes as they occur in your production environment and replicates those changes to one or more servers in any location without geographic limitations. By replicating only the bytes that change, Storage Mirroring Software uses the absolute minimum bandwidth required to replicate customer data. Advanced features allow a customer to control bandwidth usage and queue data for replication during off-peak times if desired. The software does not need special hardware to run and utilizes existing LAN or WAN infrastructure that already exists in their environment - saving time, additional investment, and maintenance. Storage Mirroring Software is storage independent and is a great complement to ProLiant Storage Servers. The flexibility, resource optimization, and application-specific protection enable customers to solidify their data and disaster protection strategies using Storage Mirroring Software Product Highlights: • High availability with Microsoft Windows 2000/NT/2003servers • Application aware and supported with Exchange, SQL and Oracle • Host-based remote storage copy with TCP/IP networks • Data distribution one-to-many or 'fan-out' to multiple destinations • Data migration utility for transferring large data projects • Centralize backup, data protection and recovery operations • Built in scheduler for off hours replication • Built in network bandwidth utilization management • Disaster recovery between source and destination failover sites • Powered by NSI Software's Double-Take patented 'Sequential Transfer • Asynchronous Replication' technology • Sequential transfer maintains write sequential across multiple files for data integrity • Asynchronous replication allows hosts to continue processing for maximum performance • Introducing a new software option (Server Recovery Option) that captures a server's configuration information including OS, patches, drivers, and Service Packs. The IT department can respond to a server failure and use the Server Recover Option to re-create the boot sequence on a new server plus all of the data captured during the replication and send that data to the production site for replacement. • Introducing a new software feature (Full Server Failover) that creates a one-to-one relationship between two servers. Should a production server fail, the server running Full Server Failover would assume the identify of the production server. The failover can occur over any distance and does not require "Enterprise" versions of the operating system or applications NOTE: DL160 G5 Storage Servers include a trial version of StorageWorks Storage Mirroring software. Special note about Microsoft iSCSI Software Target and replication:	

All HP ProLiant Storage Servers include the Distributed File System Replication (DFS-R) feature in the pre-installed Windows Storage Server 2003 R2 and Windows Unified Data Storage Server 2003 operating systems. DFS-R is a file-based replication technology that only replicates files when they are closed. Microsoft iSCSI Software Target does not close the virtual disk files (.vhd files) while they are in use, and so these files are not replicated during normal usage when replicating using DFS-R. Therefore, if iSCSI Software Target virtual disk files need to be replicated, DFS-R should not be used, and HP StorageWorks Storage Mirroring software should be considered instead. Storage Mirroring software asynchronously replicates each write into the file system to a secondary system, and therefore it can be used to effectively replicate iSCSI Software Target virtual disk files.

StorageWorks Storage Mirroring Media Kit v5	T5437A
StorageWorks Storage Mirroring NAS Edition 1 LTU	T5442A
StorageWorks Storage Mirroring NAS Edition 10 LTU	T5443A

NOTE: For more information go to the HP StorageWorks Storage Mirroring website at: http://h18006.www1.hp.com/products/storage/software/sm/index.html

Step 7 - Add a Backup Solution

Tape Drives

NOTE: For the complete listing of Tape Drive offerings, please see: http://www.hp.com/products1/storage/compatibility/tapebackup/ISS/index.html
For recommended tape drive offerings for this ProLiant server see the following:

USB Tape Drives

HP StorageWorks 1U USB Rack-Mount Kit with one DAT 72 USB Tape Drive	AG594A
HP StorageWorks 1U USB Rack-Mount Kit with one DAT 160 USB Tape Drive	AG703A
HP ProLiant USB DAT 160 Internal Tape Drive	EH976A

SAS Tape Drives

NOTE: HP recommends purchasing the HP SC44Ge HBA (416096-B21) for a dedicated SAS HBA for tape.

HP StorageWorks Ultrium 448 SAS Internal Tape Drive NOTE: HP recommends combining this tape drive with the 1U SAS Rack-Mount kit (AE459A) for a complete rack-mount solution.	DW085A
HP StorageWorks Ultrium 920 SAS Internal Tape Drive NOTE: HP recommends combining this tape drive with the 1U SAS Rack-Mount kit (AE459A) for a complete rack-mount solution.	EH847A
HP ProLiant Ultrium 920 SAS Internal Tape Drive	EH978A
HP StorageWorks LTO-4 Ultrium 1760 SAS Internal Tape Drive	EH919A

NOTE: Please refer to the "Tape Drives, Tape Autoloaders & Tape Libraries" table in the Storage section of this document for a list of SAS controllers with tape support.

SCSI Tape Drives

HP ProLiant Ultrium 920 SCSI Internal Tape Drive	EH977A

Ultrium Tape Drives

HP StorageWorks Ultrium 232 Internal Tape Drive (Carbonite) NOTE: HP recommends combining this tape drive with the 1U SCSI Rack-Mount kit (A7445B) for a complete rack-mount solution.	DW064A

HP StorageWorks 1U Rack-mount kit with one Ultrium 448 (Carbonite)	DW028B
HP StorageWorks 3U Rack-mount kit with one Ultrium 960 (Carbonite)	Q1595B
HP StorageWorks 1U SCSI Rack-mount kit with one Ultrium 920	EH903A
HP StorageWorks 1U SAS Rack-mount kit with one LTO-4 Ultrium 1760	EH946A
HP StorageWorks 3U SCSI Rack-Mount with 1 LTO-4 Ultrium 1840 Tape Drive	EH926A

NOTE: Please see the HP StorageWorks Ultrium Tape Drive QuickSpecs for additional options such as controllers, media, and other related items: http://h18006.www1.hp.com/products/quickspecs/11739_na/11739_na.html

For an up-to-date listing of the latest O/S and software support details for HP Ultrium tape drives, please visit: http://www.hp.com/go/connect.

Rack-Mount Tape Drive Enclosures

HP StorageWorks 1U SCSI Rack-Mount kit	A7445B

NOTE: The 1U Rack-Mount Kit can support up to (2) half-height tape drives and is compatible with multiple Single-Ended and LVD SCSI tape drives including the DAT 24, DAT 40, DAT 72, DLT VS80, DLT VS160, Ultrium 215, Ultrium 232, Ultrium 448 and Ultrium 920 tape drives.

HP StorageWorks 1U USB Rack-Mount Kit	A8007A

NOTE: The 1U USB Rack-Mount Kit can support up to (2) half-height tape drives and is compatible with the DAT 24 USB, DAT 40 USB and DAT 72 USB tape drives.

HP StorageWorks 1U SAS Rack-Mount Kit	AE459A

NOTE: The 1U SAS Rack-Mount Kit can support up to (2) half-height tape drives and is compatible with the Ultrium 448 SAS and Ultrium 920 SAS tape drives.
NOTE: Connecting hard drive cage and SAS tape to the same SAS Controller using split cable (supplied with tape drive) deactivates 1 of the hard drive bays. Actual hard drive bay deactivated depends on where split cable plugs into SAS drive connector. Example: 3x SAS cable connector plugged into SAS drive connector (5-8) on the back of the hard drive cage would mean drive bay 8 is deactivated.

HP StorageWorks 3U Rack-mount kit	274338-B22

NOTE: The 3U Rack-mount Kit can support up to (2) full-height or (4) half-height tape drives and compatible with multiple LVD SCSI tape drives including DAT 40, DAT 72, DLT VS160, SDLT 600, LTO-1 Ultrium 232, LTO-2 Ultrium 460, LTO-2 Ultrium 448, LTO-3 Ultrium 920, LTO-3 Ultrium 960 and LTO-4 Ultrium 1840 tape drives.

NOTE: Please see the Rack-Mount Tape Drive Kits QuickSpecs for additional information regarding these kits: http://h18000.www1.hp.com/products/quickspecs/10854_na/10854_na.html

HP D2D Backup System	HP StorageWorks D2D110 Backup System NOTE: 1TB of Disk Storage.	EH880A
	HP StorageWorks D2D110 Backup System with Data Protector Express Software Kit NOTE: 1TB of Disk Storage.	EH923A
	HP StorageWorks D2D120 Backup System NOTE: 2TB of Disk Storage.	EH884A
	HP StorageWorks D2D120 Backup System with Data Protector Express Software Kit NOTE: 2TB of Disk Storage.	EH924A
	HP StorageWorks D2D130 Backup System NOTE: 3TB of Disk Storage.	EH950A
	HP StorageWorks D2D130 Backup System with Data Protector Express Software Kit NOTE: 3TB of Disk Storage.	EH951A
	HP StorageWorks D2D130 Backup System with LTO-3 Ultrium 920 SAS Tape Drive NOTE: 3TB of Disk Storage.	EH952A
	NOTE: Please see the HP D2D Backup Systems QuickSpecs for additional information: http://h18000.www1.hp.com/products/quickspecs/12651_na/12651_na.html	

Tape Autoloaders	**HP StorageWorks DAT Autoloader**	
	HP StorageWorks DAT 72x10 tape autoloader	AE313B
	HP StorageWorks 1/8 Tape Autoloader	
	HP StorageWorks 1/8 G2 LTO-4 Ultrium 1760 SAS Tape Autoloader	AK377A
	HP StorageWorks 1/8 Ultrium 920 G2 Tape Autoloader	AH165A
	HP StorageWorks 1/8 G2 LTO-3 Ultrium 920 SAS Autoloader	AH558A
	HP StorageWorks 1/8 Ultrium 448 G2 Tape Autoloader	AH164A
	HP StorageWorks 1/8 Ultrium 232 G2 Tape Autoloader	AH163A
	HP StorageWorks 1/8 G2 Tape Autoloader Rack Kit NOTE: Required to install the 1/8 G2 Autoloaders in a standard 19-inch rack; includes rails and rackmount instructions	AH166A
	NOTE: Please reference the Tape Autoloader QuickSpecs at: http://www.hp.com/go/automation for additional information needed to create a complete solution; reference current compatibility information at: http://www.hp.com/go/ebs.	

Tape Libraries	HP StorageWorks MSL2024 Tape Library	
	HP StorageWorks MSL2024 1 LTO-4 Ultrium 1840 SCSI Drive Library	AJ033A
	HP StorageWorks MSL2024 1 LTO-4 Ultrium 1840 4GB FC Library	AJ034A
	HP StorageWorks MSL2024 1 LTO-4 Ultrium 1760 SAS Drive Library	AK378A
	HP StorageWorks MSL2024 1 Ultrium 960 Drive Library	AG115A
	HP StorageWorks MSL2024 1 Ultrium 960 4GB FC Library	AG326B
	HP StorageWorks MSL2024 1 LTO-3 Ultrium 920 SAS Drive Library	AH559A
	HP StorageWorks MSL2024 1 Ultrium 920 Drive Library	AH169A
	HP StorageWorks MSL2024 1 Ultrium 448 Drive Library	AG116A
	HP StorageWorks MSL4048 Tape Library	
	HP StorageWorks MSL4048 1 Ultrium 448 Drive Library	AG320A
	HP StorageWorks MSL4048 1 Ultrium 920 SAS Drive Library	AH560A
	HP StorageWorks MSL4048 1 Ultrium 920 Drive Library	AH171A
	HP StorageWorks MSL4048 1 Ultrium 960 Drive Library	AG322A
	HP StorageWorks MSL4048 1 Ultrium 960 4GB FC Library	AG324B
	HP StorageWorks MSL4048 2 LTO-4 Ultrium 1760 SAS Drive Library	AK380A
	HP StorageWorks MSL4048 1 LTO-4 Ultrium 1840 SCSI Drive Library	AJ035A
	HP StorageWorks MSL4048 1 LTO-4 Ultrium 1840 4GB FC Library	AJ036A
	HP StorageWorks MSL8096 Tape Library	
	HP StorageWorks MSL8096 2 Ultrium 920 SAS Drive Library	AH561A
	HP StorageWorks MSL8096 2 Ultrium 960 4GB FC Library	AH218A
	HP StorageWorks MSL8096 2 Ultrium 960 Drive Library	AH219A
	HP StorageWorks MSL8096 2 LTO-4 Ultrium 1760 SAS Drive Library	AK382A
	HP StorageWorks MSL8096 2 LTO-4 Ultrium 1840 SCSI Drive Library	AJ039A
	HP StorageWorks MSL8096 2 LTO-4 Ultrium 1840 4GB FC Library	AJ040A
	HP StorageWorks MSL6000 Tape Library	
	LTO-4 Ultrium 1840 technology	
	HP StorageWorks MSL6030 1 LTO-4 Ultrium 1840 SCSI Drive Library	AJ029A
	HP StorageWorks MSL6030 1 LTO-4 Ultrium 1840 4GB FC Library	AJ030A
	HP StorageWorks MSL6060 2 LTO-4 Ultrium 1840 SCSI Drive Library	AJ031A
	HP StorageWorks MSL6060 2 LTO-4 Ultrium 1840 4GB FC Library	AJ032A
	LTO-3 Ultrium 960 technology	
	HP StorageWorks MSL6030 1 Ultrium 960 Dr LVDS Library	AD606B
	HP StorageWorks MSL6030 1 Ultrium 960 Dr FC Library	AD608B
	HP StorageWorks MSL6030 2 Ultrium 960 Dr LVDS Library	AD607B
	HP StorageWorks MSL6030 2 Ultrium 960 Dr FC Library	AD609B
	NOTE: Please reference the MSL2024, MSL4048, MSL8096, and MSL6000 Tape Library QuickSpecs at: http://www.hp.com/go/automation for additional information needed to create a complete solution; reference current compatibility information at: http://www.hp.com/go/ebs.	

HP Data Protector Express Software	HP Data Protector Express Backup Server Software Media & LTU	BB117EA
	HP Data Protector Express Backup Server Upgrade from Data Protector Express Single Server Edition Media & LTU	BB117ET
	NOTE: To obtain a free licensed copy of HP Data Protector Express for ProLiant edition software, please visit the "Protect Your Data" link accessible from your ProLiant server's System Management Homepage (SMH) software (SmartStart 7.5 or later). NOTE: Please see the HP Data Protector Express QuickSpecs for additional information regarding the purchase of HP Data Protector Express software: http://h18000.www1.hp.com/products/quickspecs/12337_na/12337_na.html	

Step 8 - Add UPS, Power, and Rack Options

Uninterruptible Power Systems - Rack	HP R1.5 VA 1U UPS	AF419A
USB Options	HP 1GB USB 2.0 Floppy Drive Key	442085-B21
	HP 256MB USB 2.0 Floppy Drive Key	442084-B21
	USB 1.44-MB External Diskette Drive	DC141B
	USB Floppy Drive	DC361B
	HP USB-P/S2 Mouse	DC369A
	HP Keyboard (USB) standard 2004	DT528A#xxx
	HP USB Internal Cable Kit	451363-B21
HP KVM Switch Options	2x1x16 IP Console Switch with Virtual Media	AF601A
	4x1x16 IP Console Switch with Virtual Media	AF602A
	2x16 Server Console Switch with Virtual Media	AF600A
	PS/2 Virtual Media Interface Adapter, 1 pack NOTE: Requires PS/2 and one USB port on server.	AF604A
	Server Console Switch (KVM), 0 x 1 x 8 port	336044-B21
	Server Console Switch (KVM), 0 x 2 x 16 port	336045-B21
	PS/2 Interface Adapter, 1 pack	262588-B21
	PS/2 Interface Adapter, 8 pack	262587-B21
	USB Interface Adapter, 1 pack	336047-B21
	Serial Interface adapter - 1 Pack with power supply	373035-B21
	CAT5 KVM Expansion Module	262589-B21
	HP 1x4 Console Switch	AF611A
	HP PS2 Server Console Cable, 6 foot, 2-Pack	AF612A
	HP USB Server Console Cable, 6 foot, 2-Pack NOTE: Required for supporting USB peripherals.	AF613A
	NOTE: For additional information regarding KVM switches, Serial Console servers, rack mount monitors, keyboards and all related options please see the following URL: http://www.hp.com/go/kvm.	

Step 9 - Order HPTS Service Care Packs

Service Care Packs or warranty upgrades enhance the base hardware warranty provided with your HP ProLiant Storage Server. The Care Packs provide support for product software and operating system with extended hours of coverage and reduced response time. And Care Packs allow the customer to budget fixed cost support rather than variable costs that include parts and labor.

Note that the standard HP warranty ensures software media will be free of physical defect for a period of 90 days from delivery. However, all ProLiant Storage Servers come with a full year of 9 hours by 5 days software advisory and remedial software telephone support, new version license rights, and media and documentation distribution service. Extended hours of coverage and additional years of service are available should the customer require more support.

See "Service and Support Upgrade options" section for more information on available Care Packs for your ProLiant Storage Server.

Memory

Standard Memory

PC2-5300 (667MHz) Fully Buffered DIMMs with Advanced ECC Capabilities

- 1GB (2 x 512MB): 640GB model
- 2GB (2 x 1GB): 1TB SATA, 2TB SATA, 3TB SATA, and 1.2TB SAS models

Maximum Memory

- 32 GB

NOTE: Memory should be installed in pairs and matched for optimum performance.
NOTE: Chart does not represent all possible memory configurations.

Memory	Slot							
	1	2	3	4	5	6	7	8
Standard (640GB SATA)--1GB	512 MB	Empty	512MB	Empty	Empty	Empty	Empty	Empty
Standard (1TB, 2TB, 3TB SATA and 1.2TB SAS)--2GB	1 GB	Empty	1 GB	Empty	Empty	Empty	Empty	Empty
Maximum (32 GB)	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB

Memory options:

1 GB FBD PC2-5300 2X512 Kit	397409-B21
2GB FBD PC2-5300 2 X 1 GB Kit, Low Power	461826-B21
2 GB FBD PC2-5300 2X1GB Kit	397411-B21
4GB FBD PC2-5300 2 x 2 GB Kit, Low Power	461828-B21
4 GB FBD PC2-5300 2X2GB Kit	397413-B21
8 GB FBD PC2-5300 2 x 4 GB LP Kit	466440-B21
8 GB FBD PC2-5300 2X4GB Kit	397415-B21

1, 2, 3, 4	Four Large Form Factor (LFF) 3.5" drive bays for SATA or SAS hard drives
A	DVD-ROM

Drive Support

	Quantity Supported	Position Supported	
Removable Media	1 Standard	Front	DVD-ROM Drive

Hard Drives

Hot Plug 3.5" (LFF) Serial Attached SCSI - SAS

	Quantity Supported	Position Supported	Controller
300 GB 3G SAS 15K DP	4	1-4	HP Smart Array E200/128MB Controller

Hot Plug 3.5" (LFF) Serial ATA - SATA

	Quantity Supported	Position Supported	Controller
750GB SATA 7.2K 500GB SATA 7.2K 250GB SATA 7.2K 160GB SATA 7.2K	4	1-4	HP Smart Array E200/128MB Controller

External Storage

NOTE: DL160 G5 Storage Servers come standard with one installed Smart Array E200 controller for internal drives. They have one low-profile PCI Express x16 slot available for additional network ports, a backup HBA, or external storage expandability (via Smart Array E500/256MB).

	Quantity Supported	Position Supported	Controller
Modular Smart Array 60	One per Smart Array controller recommended	External	Smart Array E500 controller
Modular Smart Array 70	One per Smart Array controller recommended	External	Smart Array E500 controller
Modular Smart Array 50 Enclosure	2 per connector (supports 1+1 cascading)	External	Smart Array E500 controller

Storage

Maximum Raw Storage Capacity

Internal SAS	1.2TB (4 x 300GB SAS Drives)
Internal SATA	3.0TB (4 x 750GB SATA Drives)
Internal plus External SATA (with addition of Smart Array E500/256MB controller and MSA60 external enclosure)	12TB raw (16 x 750 GB SATA) [1 x SA E500 connected to 1 x MSA60 full of 750 GB SATA HDDs]

Factory RAID Configuration and User Storage

	Operating System Partitions		
	Volume	RAID Level	Physical Drives
Logical Disk 1	Operating System	RAID 5	0-3
Logical Disk 2	DON'T ERASE recovery partition	RAID 5	0-3
Logical Disk 3	User Data	RAID 5	0-3

Tape Drives, Tape Autoloaders, Tape Libraries & D2D Backup

NOTE: For an up-to-date listing of the latest O/S Support details for each of the Tape Drives listed below, please see the following: http://h18000.www1.hp.com/products/quickspecs/north_america/10233.html

NOTE: For an up-to-date listing of the latest O/S Support details for each of the Tape Autoloaders & Tape Libraries listed below, please see the following: http://h18000.www1.hp.com/products/quickspecs/north_america/10809.html

NOTE: For complete listing of tape drive offerings see: http://www.hp.com/products1/storage/compatibility/tapebackup/ISS/index.html

NOTE: SAS Tape Drives: Connecting hard drive cage and SAS tape to the same SAS Controller using split cable (supplied with tape drive) deactivates 1 of the hard drive bays. Actual hard drive bay deactivated depends on where split cable plugs into SAS drive connector. Example: 3x SAS cable connector plugged into SAS drive connector (5-8) on the back of the hard drive cage would mean drive bay 8 is deactivated.

For details on connecting tape drives to this storage server, see the following:

	Position Supported	Controller	Controller/HBA Option Kit Part Number
HP StorageWorks SCSI Tape, External LTO-1 Ultrium 232 LTO-2 Ultrium 448 LTO-2 Ultrium 460 LTO-3 Ultrium 920 LTO-3 Ultrium 960 LTO-4 Ultrium 1840 DAT 40 DAT 72	External	HP SC44Ge Host Bus Adapter	416096-B21

Storage

DAT 160 1U Rack-Mount Kit 3U Rack-Mount Kit			
HP StorageWorks USB Tape Drives, External DAT 40 USB DAT 72 USB DAT 160 USB 1U USB Rack-Mount Kit	External	USB 2.0 Port	N/A
HP StorageWorks SAS Tape Drives, External DAT 160 SAS LTO-2 Ultrium 448 SAS LTO-3 Ultrium 920 SAS 1U Rack-Mount Kit	External	HP SC44Ge Host Bus Adapter * HP Smart Array E500 Controller * Recommended	416096-B21 435129-B21
HP StorageWorks SCSI Tape Automation, External DAT 72X10 Autoloader 1/8 G2 Autoloader MSL2024 MSL4048 MSL8096 MSL6000	External	HP U320e SCSI Host Bus Adapter NOTE: Only valid for MSL tape libraries.	AH627A
HP StorageWorks SAS Tape Automation, External 1/8 G2 Autoloader MSL2024 MSL4048 MSL8096	External	HP SC44Ge Host Bus Adapter NOTE: Please visit: http://www.hp.com/go/connect for details about minimum SAS controller firmware version and SAS cabling requirements.	416096-B21
HP StorageWorks Fibre Tape Libraries, External MSL2024 MSL4048 MSL8096 MSL6000	External	Please consult the EBS connectivity matrix at: http://www.hp.com/go/ebs for detailed connectivity information	N/A
HP StorageWorks D2D Backup Systems D2D110 D2D120	External	Embedded Network Controller	N/A

Power Specifications

Operational Input Voltage Range (Vrms)	90Vac to 264Vac full range					
Frequency Range (Nominal) (Hz)	47 Hz to 63 Hz					
Nominal Input Voltage (Vrms)	100	115	200	220	230	240
Max Rated Output Wattage Rating	653.10	653.19	653.08	652.96	653.08	652.96
Nominal Input Current (A rms)	8.55	7.31	4.12	3.77	3.6	3.46
Max Rated Input Wattage Rating (Watts)	855	840.72	824.12	827.5	806.3	805.71
Max. Rated VA (Volt-Amp)	990	990	990	990	990	990
Efficiency (%)	76.39	77.69	79.25	78.91	81	81.04
Power Factor	0.998	0.997	0.983	0.976	0.973	0.969
Leakage Current (mA)	<3.5mA	<3.5mA	<3.5mA	<3.5mA	<3.5mA	<3.5mA
Maximum Inrush Current (A peak)	60A	60A	60A	60A	60A	60A
Maximum Inrush Current Duration (mS)	1mS	1mS	1mS	1mS	1mS	1mS

ProLiant DL160 G5 Fully Configured	115V/60Hz	220V/50Hz
Fully Loaded System Input Wattage (W)	651	638
Fully Loaded System Input Current (A rms)	5.7	3.0
Fully Loaded System Thermal (BTU- Hr)	2218	2174
Fully Loaded System VA (Volt-Amp)	657	657
System Leakage with all power supplies loaded (mA)	1.58	3.03
System Inrush Current with all power supplies loaded (A)	19	37
Power cord requirements	Nema 5-15P to IEC320-C13	IEC320-C13 to IEC320-C14

NOTE: Power shown is for a fully configured system consisting of (2) CPU, (8) double-sided DIMMs, (2) HDDs, (1) CD-ROM, and (2) PCI cards.

Power Cord AF556A

System Unit	**Dimensions** (H x W x D) (with bezel)	1.70 x 17.64 x 26.85 in (4.32 x 44.80 x 68.20 cm)	
	Weight (approximate)	All hard drives, power supplies, and processors installed	37.00 lb (16.78 kg)
	Input Requirements (per power supply)	Rated Line Voltage	90 to 140 VAC 180 to 264 VAC
		Rated Input Current	7.31A at 115VAC 3.6A at 230VAC
		Rated Input Frequency	47 to 63 Hz
		Rated Input Power	855W (at 100 VAC) 840.72W (at 200 VAC)
	Power Specifications	To review typical system power ratings use the Power Calculator which is available via the online tool located at URL: http://h30099.www3.hp.com/configurator/calc/Power%20Calculator%20Catalog.xls - Click on the system of interest. Example: DL380 G5 - Follow the instructions of the next screens.	
	Power Supply Output (per power supply)	Rated Steady-State Power	653.10W (at 100 VAC) 653.08W (at 200 VAC)
	System Inlet Temperature	Operating	50° to 95° F (10° to 35° C) at sea level with an altitude derating of 1.8°F per every 1000 ft (1.0°C per every 305 m) above sea level to a maximum of 10,000 ft (3050 m), no direct sustained sunlight. Maximum rate of change is 18°F/hr (10°C/hr). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan fault or above 86°F (30°C).
		Non-operating	40° to 140° F (-40° to 60° C) Maximum rate of change is 36°F/hr (20°C/hr)
	Relative Humidity (non-condensing)	Operating	10% to 85% relative humidity (Rh), 82.4°F (28°C) maximum wet bulb temperature, non-condensing.
		Non-operating	10% to 95% relative humidity (Rh), 101.7°F (38.7°C) maximum wet bulb temperature, non-condensing.
	Altitude	Operating	10,000 ft (3050 m). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 1500 ft/min (457 m/min).
		Non-operating	30,000 ft (9144 m). Maximum allowable altitude change rate is 1500 ft/min (457 m/min).
	Acoustic Noise	Listed are the declared A-Weighted sound power levels (LWAd) and declared average bystander position A-Weighted sound pressure levels (LpAm) when the product is operating in a 23°C ambient environment. Noise emissions	

		were measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109).
		Idle
		LWAd 6.86
		LpAm 52.36dBA
		Operating
		LWAd 6.89
		LpAm 52.60dBA
Embedded NC105i PCIe Gigabit Server Adapter	**Network Interface**	Integrated 10/100/1000BASE-T Transceiver Combines a triple-speed IEEE 802.3TM - Compliant Media Access Controller (MAC) with a triple-speed Ethernet transceiver.
	Data Transfer Method	Compliant to x1 PCIe Specification
	Network Transfer Rate	10Base-T (Half-Duplex) 10 Mb/s 10Base-T (Full-Duplex) 20 Mb/s 100Base-TX (Half-Duplex) 100 Mb/s 100Base-TX (Full-Duplex) 200 Mb/s 1000Base-TX (Half and Full-Duplex) 2000 Mb/s
	Connector	RJ-45 connector
	Cable Support	Performs all the physical layer functions for 10BASE-T, 100BASE-T, and 1000BASE-T Ethernet on standard Category 5 UTP
Environment-friendly Products and Approach	**End-of-life Management and Recycling**	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green. To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/green. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

Technical Specifications

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For hard drives, 1 GB = 1 billion bytes. Actual formatted capacity is less.